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which the anthropologist is daily busy with. I refer to Professor J. P. Lesley's "Man's Origin and Destiny sketched from the platform of Physical Sciences," published in Boston by George H. Ellis; and "The League of the Iroquois and other Legends, from the Indian Muse," issued by S. C. Griggs & Co. of Chicago. The former is the second edition of a course of lectures delivered before the Lowell Institute in the winter of 1865 and 1866. The work has long been before the public and has achieved a permanent success. The style is highly poetical, indeed it is at times painfully so. The burden of the argument is nowhere clearly stated, but the theme progresses by a series of surprises, a plan that is agreeable to the audience room, but not to the reader who wishes to digest. It is needless to state that Professor Lesley can tell us nothing new, either of man's origin or of his destiny.

Mr. Hathaway's poem is an attempt to give in a series of pictures the story of the origin of the Iroquois confederation and especially all that relates to Hayowentha. We hail with delight any and every attempt to preserve in prose or verse the sacred lore of our aborigines. The Bureau of Ethnology at Washington has during the past two years collected a hundred or more new myths, which will be published in the contributions to North American Ethnology.

ANTHROPOLOGY IN GREAT BRITAIN.—Trübner & Co. announce a work to be completed in ten volumes, entitled, "The Social History of the Races of Mankind." The IVth and concluding number of Volume X, of the Journal of the Anthropological Institute of Great Britain and Ireland gives us the following original papers.

Biddoe, Dr. John.—On anthropological colour phenomena in Belgium and elsewhere.
Rowbotham, —.—Certain reasons for believing that the art of music in prehistoric times passed through three distinct stages of development, each characterized by the invention of a new form of instrument, and that these stages invariably succeeded one another in the same order in various parts of the World.
Milne, John.—The Stone Age in Japan; with notes on Recent Geological changes which have taken place.
Tylor, E. B.—President's Annual Address.

Six pages of President Tylor's address are devoted to a very flattering review of Yarrow's "Mortuary Customs," and Col. Mallery's "Introduction to the study of the Sign Language among the North American Indians."

## GEOLOGY AND PALÆONTOLOGY.

A NEW GENUS OF TILLODONTA.—An interesting new form of this sub-order has been found in the *Catathlæus* beds (probably the Puerco formation) of New Mexico. It differs widely from the two genera hitherto known, *Anchippodus* and *Tillotherium*. Owing to the absence of the superior dental series it is not possible to be sure which tooth is the canine. The inferior dental formula may be therefore written, I. 2; C. 1; Pm. 3; M. 3; or I. 3; C. 0; Pm. 3; M. 3; or I. 3; C. 1; Pm. 2; M. 3. The first and second incisors are large and rodent-like, growing from persistent pulps; the second are the larger. The third, or canines, are small and probably not gliriform. There is no diastema. The first premolar (or canine) has a compressed crown with two cusps placed transversely to the jaw axis, and has a complete enamel sheath, and probably two roots. The succeeding tooth is also transverse, and is two-rooted, judging from the alveolus. The first and second true molars are rooted, and the crown consists of two transverse separated crests, each partially divided into two tubercles. On wearing, the grinding surface of each assumes the form of a letter B with the convexities anterior. The last inferior molar is injured. The rami are short, and the symphysis deep and recurved. This genus may be named *Psittacotherium.*

*Psittacotherium multifragum*, sp. nov.—The base of the coronoid process is opposite the junction of the second and third true molars. The ramus is deep and moderately stout. The enamel of the first incisor does not extend below the alveolar border, at the internal and external faces, and does not reach it at the sides. It has a few wrinkles on the anterior face. The anterior enamel face of the second incisor is thrown into shallow longitudinal grooves with more or less numerous irregularities from the low dividing ridges. There is a deeper groove on each side of the tooth, and there are about a dozen ridges between these on the anterior face. Both cusps of the first premolar are conic, and the external is the larger. The second true molar is a little smaller than the first. The enamel of the premolars and molars is smooth, and there are no cingula.

Probable length of dental series .0750; diameters of I. 1: anteroposterior .0120, transverse 0066; diameters I. 2: anteroposterior .0160, transverse .0115; diameters Pm. I.: anteroposterior .0072, transverse, .0130; diameters of M. II: anteroposterior .0090, transverse, .0090. Length of true molars .0038; depth of ramus at M. II. .0360.

The short deep jaws of this animal must have given it a very peculiar appearance, not unlike that of a parrot in outline.—*E. D. Cope.*

A GREAT DEPOSIT OF MUD AND LAVA.—The Atlantic and Pacific R. R. traverses the Territory of New Mexico westward from the Rio Grande river, north of its center. For a great part of the distance between that river and the Arizona border, it passes over the plateau of the Sierra Madre, which chiefly consists in this region of mesas. The mountain ranges to the north are not in sight from the railroad, and those of the south are visible at a distance. The plateau is a large anticlinal one hundred miles in width, and consists of triassic and jurassic beds. The cretaceous formations are seen highly inclined, resting upon both the eastern and western flanks. The railroad engineers have availed themselves of a line of drainage which cuts into the beds, forming a long valley extending east and west. Its water shed is about ten miles east of Fort Wingate, the streams on the one side flowing into the Atlantic, and on the other side into the Pacific oceans. They are called respectively the Puerco of the East and the Puerco of the West. Puerco means muddy, and the rivers are well named. The cliffs of jurrassic age on the north side of the valley are now a thousand feet in height near Fort Wingate, showing the enormous extent of the erosion. They consist everywhere of a soft red argillaceous arenaceous rock, and include a layer of gypsum. This material is readily eroded by atmospheric agencies, and is carried down into the valley during each rainy season in enormous quantities. The lower levels for a distance of one hundred and fifty miles E. and W., and from ten to twenty miles N. and S. consist of a vast deposit of mud. During the rainy season the streams are choked with it, and after the cessation of the rains, the borders of dried sheets of mud may be seen everywhere. Grass is buried up, but with many plants, in time, struggles through it. On the northern side of this valley, in the region of the extinct vent of San Mateo (Mt. Taylor), a lava sheet covers the older mud deposit. It displays exactly the characteristics of the cooled lava of late eruptions of Mount Vesuvius. It lies in innumerable ropes and coils, and forms like heavy drapery, as though it had cooled but yesterday. In cooling it has cracked into huge cakes. Water has percolated through the fissures, and has, in some localities, removed a large part of the supporting mud bed. Of course a portion of the mud is left beneath the middle part of the block, forming a fulcrum. With advancing erosion below, the lava block tips up, and stands obliquely on its edge. Tracts of this kind form most forbidding regions, and are absolutely impenetrable to any but small animals. Snakes appeared to be abundant in some localities passed by the train.—*E. D. Cope.*

INVERTEBRATE FOSSILS FROM THE LAKE VALLEY DISTRICT, NEW MEXICO.—Mr. S. A. Miller, of Cincinnati, has identified the following fossils from the silver-bearing carboniferous limestone of Lake Valley, New Mexico:

*Strophomena rhomboidalis*, *Spirifera striata*, *S. novomehicana*, n. sp., *S. temeraria*, n. sp., *Athyris lamellosa*, *A. planosulcata*, *Orthis ruspinata*, *O. dalyana* n. sp., *O. michelini*, *Productus semireticulatus*, *P. vittatus*, *Rhynchonella pustulosa*, *R. tuta*, n. sp., *Platyceras oëquilatera*, *Prætus proceidens*, *Amplexus fragilis*, *Cyathophyllum subcæspitosum*, *Actinocrinus dalyanus*, n. sp., *A. copei*, n. sp., *A. lineatus*, n. sp., *Nautilus (Euomphalus) rockymontanus*, n. sp., *Camaraphoria occidentalis*, n. sp., *Trematopora americana*, n. sp: two undetermined species of *Bryozoa* of the family Fenestellidæ; two undetermined species of *Zaphrentis;* a fragment of *Ortho-*

*ceras;* two undetermined species of *Platycerinus;* three undetermined species of *Actinoceras.* Mr. Miller remarks that the age of the rocks, if all the fossils are from one range, is that of the Upper Burlington or Lower Keokuk, but if of different elevations, they represent these two groups respectively.

Some specimens are of interest as showing the nature of the process of deposit of silver in the limestone. A *Zaphrentis* and an *? Orthis* in good preservation, are partially replaced by argentiferous iron, which retains their structual details. This shows clearly that the process is one of replacement of the limestone by a fluid holding the metals in solution, and not by injection. This is also demonstrated by the undisturbed condition of the thin bedded limestone where traversed by veins of ore.—*E. D. Cope.*

INSECTS OF THE AMYZON SHALES OF COLORADO.—In the Bulletin of the U. S. Geological Survey of the Territories of Hayden, Mr. Scudder publishes a review of the geology and palæontology of the above deposit. He observes: "The insects preserved in the Florissant basin are wonderfully numerous, this single locality having yielded in a single summer more than double the number of specimens which the famous localities at Oeningen, in Bavaria, furnished Heer in thirty years.

"The examination of the immense series of specimens found at Florissant has not gone far enough to yield data sufficiently definite for generalizations of any value, or which might not be altered, or even reversed, on further study. It may, nevertheless, be interesting to give a running note of what has been observed in assorting the collection, and to make the single comparison with the Oeningen insect fauna which the number of individuals will furnish.

"This is indicated by the following table, based on a rough count of the Florissant specimens, but which cannot be far astray.

| Percentage of representation by | At Florissant. | At Oeningen. |
|---|---|---|
| Hymenoptera | 40 | 14 |
| Diptera | 30 | 7 |
| Coleoptera | 13 | 48 |
| Hemiptera | 11 | 12 |
| Neuroptera | 5 | 17 |
| Orthroptera | ¼ | 3 |
| Arachnida | ¼ | ½ |
| Myriapoda | $\frac{1}{25}$ | |
| Lepidoptera | $\frac{1}{25}$ | $\frac{1}{10}$ |
| | 99.58 | 101.6 |

"The plants, although less abundant than the insects, are exceedingly numerous, several thousand specimens having passed through the hands of Mr. Leo Lesquereux. Of these he has published thirty-seven species in his Tertiary Flora, about two-fifths of which are considered identical with forms from the European Tertiaries. "We have in all from ninety to a hundred species of plants recognized from these Florissant beds, of which half the species belong to the apetalous exogens.

"The testimony of the few fishes to the climate of the time, is not unlike that of the plants, suggesting a climate, as Professor Cope informs me, like that at present found in latitude 35° in the United States; while the insects, from which, when they are completely studied, we may certainly draw more definite conclusions, appear from their general ensemble to prove a somewhat warmer climate. White ants are essentially a tropical family, only one or two out of eighty known species occurring north of latitude 40°. In North America only three have been recorded north of the border of the Gulf of Mexico, excepting on the Pacific coast, where one or two more extend as far as San Francisco. Two species, both belonging to the second section, are found in the valleys below Florissant, in 39° north latitude. Florissant itself is situated 2500 meters above the sea, and the presence of so considerable a number of white ants embedded in its shales, is indicative of a much warmer climate at the time of their entombment than the locality now enjoys. Investigation of other forms increases the weight of this evidence at every step, for nearly all the species (very few, certainly, as yet) which have been carefully studied, are found to be tropical or sub-tropical in nature. As, however, most of those studied have been selected for some striking feature, too much weight should not be given to this evidence."

This subject will be discussed in a forthcoming volume of the Report of the U. S. Geological Survey of the Territories of Dr. Hayden. The illustrations of this work which we have seen are of unusual excellence.

THE FUTURE OF GEOLOGY.—Professor Ramsey, in his address before the British Association, said that in the British Islands the art of geological surveying has, he believed, been carried out in a more detailed manner than in any other country in Europe, a matter which has been rendered comparatively easy by the excellence of the Ordnance Survey maps both on the 1-inch and the 6-inch scales. When the whole country has been mapped geologically little will remain to be done in geological surveying, excepting corrections here and there, especially in the earliest published maps of the Southwest of England. Palæontological detail may, however, be carried to any extent, and much remains to be done in miscroscopic petrology which now deservedly occupies the attention of many skilled observers.

It is difficult to deal with the future of geology. Probably in many of the European formations more may be done in tracing the details of subformations. The same may be said of much of

North America, and for a long series of years a great deal must remain almost untouched in Asia, Africa, South America, and in the islands of the Pacific ocean. If, in the far future, the day should come when such work shall be undertaken, the process of doing so must necessarily be slow, partly for want of proper maps, and possibly in some regions partly for the want of trained geologists. Palæontologists must always have ample work in the discovery and description of new fossils, marine, fresh-water, and truly terrestial; and besides common stratigraphical geology, geologists have still an ample field before them in working out many of those physical problems which form the true basis of physical geography in every region of the earth. Of the history of the earth there is a long past, the early chapters of which seem to be lost forever, and we know little of the future except that it appears that "the stir of this dim spot which men call earth," as far as geology is concerned, shows "no sign of an end."

## MINERALOGY.[1]

PHYTOCOLLITE, A NEW MINERAL FROM SCRANTON, PA.—This name has been given[2] to a very curious, jelly-like mineral recently found near the bottom of a peat bog at Scranton, Pa. An excavation for a new court-house had cut through a peat bog, below which was a deposit of glacial till. Near the bottom of the bog, in a carbonaceous mud, or "swamp muck," there occur irregular veins, of varying thickness and inclination filled with a black, homogeneous jelly-like substance, elastic to the touch. This substance becomes tougher on exposure to the air, and finally becomes as hard as coal. When thus dried, it is brittle, has a conchoidal fracture and brilliant lustre, and closely resembles jet. It is nearly insoluble in alcohol and ether, but is entirely soluble in caustic potash, forming a deep reddish-brown solution, from whence it can be again precipitated on the addition of an acid. It has a specific gravity of 1.032 and burns with a bright flame. After having been dried at 212°, it has the following composition, according to the analysis of J. M. Stinson:

| | | or without Ash | |
|---|---|---|---|
| C | 28.989 | C | 30.971 |
| H | 5.172 | H | 5.526 |
| N | 2.456 | O + N | 63.503 |
| O | 56.983 | | |
| Ash | 6.400 | | 100. |
| | 100. | | |

yielding the empirical formula $C_{10}\ H_{22}\ O_{16}$.

In its mode of occurrence and in general appearance, this substance closely resembles Dopplerite, but differs from that mineral

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[1] Edited by Professor HENRY CARVILL LEWIS, Academy of Natural Sciences, Philadelphia, to whom communications, papers for review, etc., should be sent.

[2] H. C. Lewis, Proc. Amer. Philos. Soc., Dec. 2, 1881.